

MODULE 1: Python Basics & Core Programming (15 Hours)

Introduction to Python (2 Hours)

- What is Python?
- Installation & Setup (Anaconda, Jupyter Notebook, VS Code)
- Running Python Programs (Interactive & Script Mode)

Python Fundamentals (5 Hours)

- Variables & Data Types
- Operators (Arithmetic, Logical, Relational)
- Conditional Statements (if-else)
- Loops (for, while)
- Functions (Types, Arguments, Lambda Functions)

Data Structures in Python (5 Hours)

- Strings: Operations, Slicing, Methods
- Lists: Accessing, Modifying, Methods, List Comprehensions
- Dictionaries: Key-Value Pairs, Operations
- Sets: Set Operations, Built-in Functions

Object-Oriented Programming (3 Hours)

- Classes & Objects
- Inheritance & Polymorphism
- Encapsulation & Data Hiding

MODULE 2: Python for Data Science (15 Hours)

Working with Files & Exception Handling (2 Hours)

- File Handling (Read, Write, Append)
- Exception Handling (try-except, finally)

NumPy for Data Manipulation (4 Hours)

- Arrays vs Lists
- Creating & Modifying Arrays
- Array Indexing & Slicing
- Mathematical Operations

Pandas for Data Handling (5 Hours)

- DataFrames & Series
- Importing Datasets (CSV, JSON, Excel)
- Data Cleaning & Handling Missing Data

Data Visualization using Matplotlib & Seaborn (4 Hours)

- Line Charts, Bar Graphs, Pie Charts
- Histograms, Scatter Plots, Heatmaps

MODULE 3: AI & Machine Learning (50 Hours)

Introduction to AI & ML (3 Hours)

- AI vs ML vs Deep Learning
- Supervised vs Unsupervised Learning
- Real-World Applications

Supervised Learning Algorithms (12 Hours)

- Linear & Logistic Regression
- Decision Trees & Random Forest
- Support Vector Machines (SVM)
- Naïve Bayes Classifier

Unsupervised Learning Algorithms (7 Hours)

- K-Means Clustering
- Hierarchical Clustering
- Principal Component Analysis (PCA)

Deep Learning with TensorFlow & Keras (14 Hours)

- Introduction to Neural Networks
- Activation Functions
- Building Artificial Neural Networks (ANN)
- Convolutional Neural Networks (CNN)
- Recurrent Neural Networks (RNN)

Natural Language Processing (NLP) (8 Hours)

- Text Preprocessing (Tokenization, Lemmatization)
- Bag of Words & TF-IDF
- Named Entity Recognition (NER)
- Sentiment Analysis

Reinforcement Learning (6 Hours)

- Agents & Environment
 - Q-Learning Algorithm
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Total Duration: 80 Hours

This version **expands AI/ML** while keeping Python foundational topics concise but effective. It includes **CNN, RNN, and reinforcement learning**, ensuring a well-rounded curriculum